

ABSTRACT

An apparatus and method for achieving ultrahigh-power output from a solid-state laser. The solid-state laser of the subject invention uses multiple disk-shaped laser gain media (subapertures) placed adjacent to each other to fill an optical aperture of an AMA module. In one preferred embodiment each of the laser gain media is provided with optical coatings for operation in the active mirror configuration. Furthermore, each of the laser gain media is hydrostatic pressure-clamped to a rigid, cooled substrate, which allows it to maintain a prescribed shape even when experiencing significant thermal load. A cooling medium can be provided to a heat exchanger internal to the substrate and/or flowed through the passages on the substrate surface, thereby directly cooling the laser gain medium.